

REMARKS

Entry of the present amendment and favorable reconsideration and allowance of all pending claims are solicited.

1. Discussion of Claim Amendments

By way of the amendment instructions above, claim 1 has been amended so as to clarify that the polybutylene terephthalate-series resin (A) comprises a polybutylene terephthalate-series copolymer modified with not more than 30% by mol of a copolymerizable monomer. As such, claim 2 has been canceled as redundant.

Therefore, upon entry of this amendment, claims 1-3, 5, and 7-13 will remain pending in this application.

2. Examiner's Position

The Examiner asserts that prior claims 1-2, 5 and 7-13 are "obvious", and hence unpatentable, under 35 USC §103(a) based on US 2002/0188073 (Uno et al) in view of US 2003/0130381 (Joachimi et al). In addition, US 2002/0190408 (Houston et al) was combined with Uno et al and Joachimi et al to separately reject claim 3 under the same statutory provision. Applicants respectfully suggest that none of the applied references is appropriate against the presently pending claims.

3. Discussion of Applied References

(3-1) Uno et al: US 2002/0188073

Uno et al. disclose a "... polyester type resin composition comprising (A) 30 to 95 parts by weight of a polybutylene terephthalate type resin containing a polybutylene terephthalate-isophthalate copolymer in which the content of an isophthalic acid ingredient to the entire dicarboxylic acid ingredient is 3 to 30 mol %,

(B) 1 to 30 parts by weight of a polycarbonate resin,
(C) 1 to 30 parts by weight of an elastomer, and
(D) 3 to 60 parts by weight of a fibrous reinforcing material, wherein the total amount for (A)-(D) is 100 parts by weight." (claim 1).

Uno et al note that:

"The polybutylene terephthalate/isophthalate copolymer used...is a copolymer of terephthalic acid, isophthalic acid and 1 ,4-butanediol, The content of the isophthalic acid ingredient in the entire dicarboxylic acid ingredient in the polybutylene terephthalate/isophthalate copolymer (hereinafter referred to as isophthalic acid content) is 3 to 30 mol. %. Preferably, it is 3 to 20 mol % in view of the balance between the alkali resistance and the moldability. When the isophthalic acid content is less than 3 mol. %, the alkali resistance is insufficient, failing to attain the object of the invention. On the other hand, if it exceeds 30 mol %, it is not preferred since the moldability is lowered" (paragraph number [0024]).
..."0.1 to 5 parts by weight of a silicone compound (E) is added and blended based on 100 parts by weight of the total amount f or (A)-(D)." (claim 2).

Furthermore, Uno et al instruct that:

"The ingredient (C) used ... can include olefin, butadiene, polyester, polyamide or silicone type elastomers, preferably olefin type elastomer among them, and more preferably, an ethylenic copolymer formed by copolymerizing ethylene and one or more of comonomers selected from α -olefin of 3 or more carbon atoms or α,β -unsaturatsd acid and an alkyl ester thereof" (paragraph number [0032])....[T]he alkali resistance can further be improved by adding and blending the silicone compound (K)"

(paragraph number [00393]).....The polyester type resin composition ... is a resin composition excellent in the alkali resistance and the mechanical strength and is useful as molding products by insert molding of metals, car mounted components and molding products used being buried in cement while taking advantage of such characteristics....Specific applications for use can include car electronic equipment such as solenoid valves, sensors, engine control units and ignition coils, as well as building components for example, cement joining jigs" (paragraph numbers [0053] [0054]).

Regarding the advantages of Uno et al., it is noted that:

"[The composition concerns] a polyester type resin composition and a molding product thereof and, more in particular, it relates to a polyester resin composition excellent in chemical resistance, particularly, resistance to alkaline solutions and also excellent in mechanical strength, and a molding product formed by metal insert molding of the resin composition" (paragraph number (0001]).

(3-2) Joachimi et al: US 2003/0100381

Joachimi et al disclose:

- ""A composition comprising:
 - A) 35 to 99.999 wt - % of a laser-transparent thermoplastic material
 - B) 0.001 to 0.1 wt. % of one or more IR-absorbing compound selected from the group comprising phthalocyanine, naphthalocyanine, perylene, quaterylene, metal complex, azo dye, anthraquinone,

- squaric acid derivative, immonium dye and polymethine,
- C) 0 to 70 wt. % of a mineral filler or reinforcing substance D) 0 to 30 wt. % of an additive, wherein the total composition has a carbon black content of less than 0.1 wt. %" (claim 1).

Joachimi et al describe:

"Suitable as component A are polymers or copolymers, for example based on partially aromatic polyesters such as for example polyalkylene terephthalates, aromatic polyesters, polyamide, polycarbonate, polyacrylate, polymethacrylate, ABS graft polymers, polyolefins such as polyethylene or polypropylene, polystyrene, polyvinyl chloride, polyoxymethylene, polyimides, polyethers and polyether ketones, which may be used individually or as a blend of various polymers" (paragraph number [0033]).

Further, Joachimi et al note that:

"More preferred are polyalkylene terephthalates that have been produced solely from terephthalic acid and its reactive derivatives, such as its dialkyl esters, and ethylene glycol and/or propanediol-1,3 and/or butanediol-1,4, such as, polyethylene terephthalate and polybutylene terephthalate, and mixtures of these polyalkylene terephthalates....Preferred polyethylene terephthalates are also copolymers that are produced from at least two of the acid components mentioned above and/or from at least two of the alcohol components mentioned above: more preferred copolymers are poly-(ethylene glycol/butanediol-1, 4) –terephthalates." ([0050] and [0051])....As Component D) the compositions according ... may

furthermore contain additives, such as, for example, flame retardants, stabilizers, pigments, processing auxiliaries such as for example lubricants, nucleating agents, rubber-elastic polymers, often also termed impact modifiers, elastomers or rubber, such as, for example, rubbers or polyolefins, etc. (paragraph number [0115]). ... As examples of plasticizers there may be mentioned phthalic acid diethyl ester, phthalic acid dibenzyl ester, phthalic acid butylbenzyl ester, hydrocarbon oils and N- (n-butyl) -benzenesulfonamide" (paragraph number [0124]).

Regarding advantages of Joachimi et al, it is described therein that:

"An object...is to provide natural-colored and pigmented laser-absorbing molding compositions for the production of molded parts having a high surface quality that can be reliably joined to laser-transparent molded parts by a laser beam process. Another object of the present invention is to provide a laser-absorbing material that is transparent or translucent in the visible region of the spectrum in layers up to 5 mm thick. A further object of the present invention, is to provide both molded parts that appear to the human eye to have a very similar optical appearance as regards color and surface quality" (paragraph number [0024]).

(3-2) Houston et al: US 2002/0190408

Houston et al disclose:

"A method of locking in a desired morphology in a polymeric material, the method comprising the steps of:
mixing together a dead polymer, a reactive plasticizer, and
an initiator to form a polymerizable composition;

processing said polymerizable composition to give a desired morphology of the polymeric constituents of said polymerizable composition;
shaping said polymerizable composition into a desired geometry; and
exposing said polymerizable composition to a source of polymerizing energy, to give a polymeric material wherein said desired morphology is locked in place"
(claim 1)

Houston et al describe:

"When the mixture refractive index is an especially important consideration, high refractive index polymers may be used as one or more of the dead-polymer components. Examples of such polymers include polycarbonates and halogenated and/or sulfonated polycarbonates, ... In general, increasing the aromatic content, the halogen content (especially bromine), and/or the sulfur content are effective means well known in the art for increasing the refractive index of a material. High index, low density, and resistance to impact are properties especially preferred for ophthalmic lenses as they enable the production of ultra thin, lightweight eyeglass lenses, which are desirable for low-profile appearances and comfort and safety of the wearer.

Alternatively, elastomers, thermosets (e.g., epoxies, melamines, acrylated epoxies, acrylated urethanes, etc., in their uncured state), and other non—thermoplastic polymeric compositions may be desirably utilized during the practice of this invention.

As discussed previously, mixtures of such materials may also be beneficially used to create morphologically stable parts with desirable properties. For example, impact modifiers (usually lightly crosslinked particles or linear polymer chains) may be blended into various thermoplastics or thermoplastic elastomers to improve the impact strength of the final cured resin. In such cases, the presence of the reactive plasticizers may facilitate blending by lowering the softening temperature of the polymers to be blended. This is especially advantageous when temperature-sensitive materials are being blended with high—g polymers. When optically clear materials are desired, the mixture components (i.e., the dead polymers, the impact modifiers, and/or the reactive plasticizers) may be chosen to produce the same refractive index between the phases (iso—refractive) such that light scattering is reduced. When iso-refractive components are not available, the reactive plasticizers may nonetheless act as compatibilizers to help reduce the domain size between two immiscible polymers to below the wavelength of light, thus producing an optically clear polymer mixture that would otherwise have been opaque. The presence of reactive plasticizers may also in some cases improve the adhesion between the impact modifier and the dead polymer, improving the resultant mixture properties" (paragraph number [0052]—[0054].

Regarding advantages of Houston et al, there is described:

"The present invention is directed to a method for manipulating and controlling the phase—separation behavior, morphology, and molecular orientation in a wide variety of materials containing at least one polymeric component" (paragraph number [0006])

4. Patentability of the Present Invention over the Applied References

The applied references fail to disclose a combination for laser welding in the specific proportion of the polybutylene terephthalate-series resin (PBT-series copolymer), the specific elastomer, the polycarbonate-series resin and the specific plasticizer as is defined in the present applicants' claims.

Regarding the PBT-series resin, Uno et al. disclose a polybutylene terephthalate-isophthalate copolymer. However, the copolymer of Uno et al is used for improvement of the alkali resistance and moldability. That is, Uno et al are silent regarding the technical effects of a PBT-series copolymer in laser welding.

On the other hand, although Joachimi et al. disclose a laser welding, a PBT-series copolymer is exemplified as equivalent with other resins such as PET, polyamide, and polycarbonate. Additionally, PET or PA6 individually are used as the resin component in Examples of Joachimi et al. Houston et al fail to disclose the PBT-series copolymer per se.

Accordingly, all references fail to disclose the technical effects of a PBT-series copolymer for laser welding.

Furthermore, as mentioned in the response to the previous office action, Uno et al. fail to teach or suggest both the specific elastomer and the specific plasticizer in relation to the laser welding. Moreover, Joachimi et al. fail to disclose a combination of the PBT-series copolymer and a polycarbonate-series resin, the ratio of both resins, and the amounts of the elastomer and the plasticizer. Therefore, the combination for laser welding in the specific proportion of the PBT-series copolymer, the specific elastomer, the polycarbonate-series resin and the specific plasticizer as defined in applicants' claims could not be predicted from the references either taken alone or in combination with one another.

According to the present invention, unexpected advantages can be obtained. In this regard, Applicants note that, since the composition of Joachimi et al. comprise a thermoplastic material and general additives, the molded product cannot be uniformly welded to a counterpart material. On the other hand, since the compositions of Houston and Uno et al. are obtained by general molding such as compression molding or injection molding, laser weldability would never be predicted therefrom. Also, even if the compositions of the references are applied to the laser welding, the molded products cannot be uniformly welded to a counterpart material. That is, the composition of Houston et al. comprises a resin component and the reactive plasticizer, and an olefinic elastomer is used as the elastomer in the composition of Uno et al.. As a result, laser weldability and welding strength of these compositions cannot be improved.

On the contrary, according to the present invention, since the specific PBT-series copolymer, the specific elastomer, the polycarbonate-series resin and the specific plasticizer are combined in specific proportions as defined in the pending claims, the molded product having a uniform transmittance over the entire molded product and thus a highly uniform laser weld is obtained even though a PBT-series resin is used as the base material. The thus obtained molded product can be uniformly welded and joined to a counterpart material with the use of a laser beam. Moreover, these effects of the present composition containing the specific PBT-series copolymer are supported by Examples of the present specification.

Since the effects of the compositions as claimed could not be predicted from the combination of references relied upon in the subject Official Action, they cannot render them unpatentable under 35 USC §103(a). Withdrawal of all such rejections is therefore in order.

SAKATA et al
Serial No. 10/574,574
December 11, 2008

5. Fee Authorization

The Commissioner is hereby authorized to charge any deficiency, or credit any overpayment, in the fee(s) filed, or asserted to be filed, or which should have been filed herewith (or with any paper hereafter filed in this application by this firm) to our Account No. 14-1140.

Respectfully submitted,

NIXON & VANDERHYE P.C.

By: _____ /Bryan H. Davidson/
Bryan H. Davidson
Reg. No. 30,251

BHD:dlb
901 North Glebe Road, 11th Floor
Arlington, VA 22203-1808
Telephone: (703) 816-4000
Facsimile: (703) 816-4100